

Appl. No. 09/975,682  
Arndt, dated December 14, 2005  
Reply to Office Action of September 20, 2005

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Please cancel claim 10 without prejudice, and amend claims 1, 5, 6, 8, 9, 11, 14, 16-18 and 23 as follows:

1. (Currently amended) Method for reducing cross-talk in a communication system comprising a plurality of transmitters for transmitting encoded data signals via respective communications channels, said method comprising the steps of:

processing a first encoded data signals from the plurality of transmitters utilizing according to at least one pre-coding matrix to produce a first pre-coded signal, ~~each said at least one pre-coding matrix having associated with it a respective encoded data signal;~~

communicating said first pre-coded signal to a respective first communication channel;  
and

adapting said at least one pre-coding matrix in response to an impairment indicative signal;

said processing tending to offset channel impairments within said first communications channel.

2. (Previously presented) The method of claim 1, further comprising the steps of:  
receiving said first pre-coded signal from said first communications channel; and

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generating said impairment indicative signal in response to a determination of a channel impairment level of said first communications channel.

3. (Original) The method of claim 2, wherein said impairment indicative signal is determined according to a least mean square (LMS) algorithm.

4. (Previously presented) The method of claim 1, wherein signals propagated via each of said communications channels comprise a respective set of in-phase (I) and quadrature (Q) signals forming carrierless amplitude and phase (CAP) modulated signals.

5. (Currently amended) The method of claim 1, wherein signals propagated via each of said communications channels comprise a respective set of in-phase (I) and quadrature (Q) signals forming quadrature amplitude modulated (QAM) signals.

6. (Currently amended) The method of claim 1, further comprising the step of: prior to processing said first encoded data signal, selecting, as initial parameters of said at least one pre-coding matrix, a set of parameters tending to offset said channel impairments of said first communications channel, said step of selecting comprising the steps of:

propagating a pre-defined training sequence via said first communications channel;

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receiving said pre-defined training sequence from said first communications channel; and

determining initial parameters of said at least one pre-coding matrix, using said received pre-defined training sequence, related to channel impairments of said first communications channel.

7. (Previously presented) The method of claim 4, wherein said step of adapting comprises the steps of:

increasing an amplitude level of at least one respective set of said I and Q signals; and repeating said steps of processing and communicating until an impairment indicative signal level is less than a threshold level.

8. (Currently amended) The method of claim 1, wherein said communications system comprises N transmitters, where N is an integer, ~~each of said N transmitters performing~~ ~~said steps of processing, communicating and adapting using respective encoded data signals.~~

9. (Currently amended) The method of claim 8, wherein each of said N transmitters processes an encoded data signal ~~according to N-1 utilizing a pre-coding matrixees, each of said N-1 pre-coding matrixees being associated with a respective processing~~ encoded data signals from the other transmitters.

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10. (Canceled)

11. (Currently amended) The method of claim 8, wherein:

each of said N transmitters performs the step of selecting initial parameters for its respective ~~at least one~~ pre-coding matrixes prior to processing a respective encoded data signal, said selected initial parameters tending to offset channel impairments of said respective communications channels, said step of selecting comprising the steps of:

propagating a pre-defined training sequence via a respective communications channel;

receiving said pre-defined training sequence from said respective communications channel; and

determining initial parameters of said at least one pre-coding matrix, using said received pre-defined training sequence, to adapt to said channel impairments of said respective communications channel.

12. (Original) The method of claim 6, further comprising the step of training an equalizer to reduce channel-specific impairments from said received pre-defined training sequence prior to selecting said initial matrix parameters.

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13. (Original) The method of claim 11, further comprising the step of training an equalizer to reduce channel-specific impairments from said received pre-defined training sequence prior to selecting said initial matrix parameters.

14. (Currently amended) Method for reducing cross-talk in a communications system comprising a plurality of communications channels, each communications channel propagating a respective set of in-phase (I) and quadrature(Q) signals, said method comprising the steps of:

- (a) processing ~~at least one set of~~ I and Q signals from each communications channel utilizing according to a respective pre-coding matrix to produce respective pre-coded I and Q signals for each communications channel;
- (b) communicating said ~~at least one set of~~ pre-coded I and Q signals via a respective communications channels;
- (c) receiving, for each communicated set of said pre-coded I and Q signals, and generating difference error data indicative of transmission errors in received signals for each communications channel;
- (d) adapting respective the pre-coding matrixes for each communications channel in responses to responsive-received difference data; and
- (e) repeating steps (a) through (d) until said difference error data associated with said at least one set of I and Q signals is less than a threshold difference level.

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15. (Previously presented) The method of claim 14, wherein said error data comprises mean square error data.

16. (Currently amended) The method of claim 14, wherein said at least one set of in-phase (I) and quadrature (Q) signals form carrierless amplitude and phase (CAP) modulated signals.

17. (Currently amended) The method of claim 14, wherein said at least one set of in-phase (I) and quadrature (Q) signals form quadrature amplitude modulated (QAM) signals.

18. (Currently amended) The method of claim 14, further comprising the steps of:  
(f) increasing an amplitude level of said at least one set of said I and Q signals; and  
(g) repeating steps (a) through (d) until said difference error data associated with said at least one set of I and Q signals is less than a second threshold difference level.

19-22. (Canceled)

23. (Currently amended) Apparatus for reducing cross-talk in a communications system comprising a plurality of transmitters for transmitting encoded data signals via respective communications channels, said apparatus comprising:

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means for processing a first encoded data signals from the plurality of transmitters  
utilizing according to at least one pre-coding matrix to produce a first pre-coded signal, each said  
at least one pre-coding matrix having associated with it a respective encoded data signal;  
means for communicating said first pre-coded signal to a respective first communications  
channel; and  
means for adapting said at least one pre-coding matrix in response to an impairment  
indicative signal;  
said processing tending to offset channel impairments within said first communications  
channel.